

Application Serial No.: 10/522,724
Reply to Office Action dated May 16, 2006

IN THE DRAWINGS

The attached sheets of drawings include changes to Figures 1 and 2. These sheets, which include Figures 1 and 2, replace the original sheets including Figures 1 and 2.

Attachment: Replacement Sheets

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REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 11-25 are presently active in this case, Claims 11 and 24 having been amended by way of the present Amendment. Claims 1-10 have been canceled without prejudice or disclaimer. Care has been taken such that no new matter has been entered. (See, e.g., page 7, lines 2-7.)

In the outstanding Official Action, the drawings were objected to for the informalities noted in the Notice of Draftsperson's Patent Drawing Review. Submitted concurrently herewith are Replacement Sheets that include changes to Figures 1 and 2 to address the objections. Accordingly, the Applicants request the withdrawal of the objection to the drawings.

The specification was objected to for minor informalities. Accordingly, the specification has been amended to include headings and the Abstract has been amended to correct the noted informality. The Applicants therefore request the withdrawal of the objections to the specification.

Claims 11 and 24 were objected to for minor informalities. Accordingly, Claims 11 and 24 have been amended as suggested in the Official Action. Thus, the Applicants request the withdrawal of the objection to the claims.

Claims 11-18 and 21-25 were rejected under 35 U.S.C. 102(a) as being anticipated by Schnaibel et al. (WO 02/08594 A1, which has English equivalent U.S. Patent No. 6,862,880). Claims 11-18 and 21-25 were rejected under 35 U.S.C. 102(e) as being anticipated by Takaku

et al. (U.S. Patent No. 6,502,388). Claims 17 and 18 were rejected under 35 U.S.C. 103(a) as being unpatentable over Schnaibel et al. For the reasons discussed below, the Applicants request the withdrawal of the art rejections.

In the Office Action, the Schnaibel et al. and Takaku et al. references are each indicated as anticipating Claims 11 and 24. The Applicants note that a claim is anticipated only if each and every element as set forth in the claims is found, either expressly or inherently described, in a single prior art reference. As will be demonstrated below, these references clearly do not meet each and every limitation of the pending independent Claims 11 and 24.

Claim 11 of the present application recites a method for control of operation of a nitrogen oxides trap, wherein a first oxygen sensor is disposed in an exhaust pipe downstream from the nitrogen oxides trap, the method comprising observing evolution of a meaningful signal representative of a signal delivered by the first oxygen sensor, and using an increase of the meaningful signal from a first plateau of substantially constant level, reached following a variation subsequent to a changeover of the engine from running on a lean mixture to running on a rich mixture, to a second plateau of substantially constant level as an indicator to command an end of purging. Claim 24 recites a device for control of an operation of a nitrogen oxides trap comprising a first oxygen sensor disposed on an exhaust line downstream from the nitrogen oxides trap, and calculating means for determining an increase of a meaningful signal representative of the signal delivered by the first oxygen sensor from a first plateau of substantially constant level, reached following initiation of a purging operation, to a second plateau of substantially constant level and using the increase as an

indicator to command an end of purging. The Applicants submit that the cited references fail to disclose all of the above limitations.

The Schnaibel et al. reference describes a method of operating a catalytic converter arranged in the exhaust gas of an internal combustion engine. The Schnaibel et al. reference describes a rear exhaust-gas sensor (14) that is arranged after the catalytic converter (12). The Schnaibel et al. reference indicates that one may infer that the regeneration phase (32) of nitrogen-oxide storage catalyst (12') has ended, when the gradient of the output signal (31) of the exhaust-gas sensor (14) exceeds a specifiable limiting value, or, alternatively, one may deduce that regeneration phase (32) has ended when the gradient of output signal (31) of exhaust-gas sensor (14) initially exceeds a specifiable, first limiting value and then falls below a specifiable, second limiting value. According to this alternative embodiment, the transition of the curve of output signal (31) from the relatively steep slope to a constant level (a point of inflection of the curve of output signal 31) during oxygen regeneration phase (33) may be detected.

The Schnaibel et al. reference further describes that the oxygen concentration in the exhaust gas after catalytic converter (12) decreases further towards the end of oxygen regeneration phase (33), which leads to a further increase in output signal (31) of exhaust-gas sensor (14). The Schnaibel et al. reference indicates that this increase in output signal (31) is ascertained in order to detect the end of oxygen regeneration phase (33), and that one may deduce that the oxygen regeneration phase has ended, when the gradient of output signal (31) of exhaust-gas sensor (14) exceeds a specifiable, third limiting value, i.e. when the curve of output signal (31) exceeds a certain slope, or, as an alternative, one may deduce that oxygen

regeneration phase (33) has ended, when the gradient of output signal (31) of exhaust-gas sensor (14) initially exceeds a specifiable, third limiting value and then falls below a specifiable, fourth limiting value again.

The Schnaibel et al. reference does not disclose using an increase of a meaningful signal from a first plateau of substantially constant level, reached following a variation subsequent to a changeover of the engine from running on a lean mixture to running on a rich mixture, to a second plateau of substantially constant level as an indicator to command an end of purging, as recited in Claim 11, or calculating means for determining an increase of a meaningful signal representative of the signal delivered by the first oxygen sensor from a first plateau of substantially constant level, reached following initiation of a purging operation, to a second plateau of substantially constant level and using the increase as an indicator to command an end of purging, as recited in Claim 24. The Schnaibel et al. reference makes no mention of such a second plateau, and, in fact, no such plateau is present in the depiction in Figure 2, rather to the contrary the output signal depicted in Figure 2 increases at the end of oxygen regeneration phase (33) and then quickly drops.

Accordingly, the Schnaibel et al. reference fails to disclose all of the limitations recited in independent Claims 11 and 24 of the present application. Thus, the Applicants respectfully request the withdrawal of the anticipation rejections of independent Claims 11 and 24 based on the Schnaibel et al. reference.

The Takaku et al. reference describes an engine exhaust gas cleaning system that attempts to accurately judge whether or not there is remaining capacity in an NOx trapping amount of an NOx trapping agent, that can optimize the timing of NOx purge control, and

that can diagnose the deterioration of the NOx trapping agent. The Official Action cites Figure 7 and steps 202 and 205 for the teaching of the features regarding the indicator to command an end of purging set forth in Claims 11 and 24 of the present application. However, these portions of the Takaku et al. reference describe setting an appropriate threshold VS as shown in Figure 7, and the time period from starting the NOx purge control to the time when the output of the second air-fuel ratio sensor (25) crosses with the threshold VS is defined as TD. The Takaku et al. reference indicates that by setting the threshold VS to approximately 0.8 V in the case of the NOx trapping agent used for an experiment, it has been checked from the experiment that the timing of the output of the second air-fuel ratio sensor (25) crossing with the threshold VS is the completion timing of purging NOx trapped to the NOx trapping agent (15), and therefore, the purge control is ended after the output of the second air-fuel ratio sensor (25) crosses with the threshold VS.

Thus, the Takaku et al. reference does not specifically describe a first plateau of substantially constant level, or using an increase therefrom to a second plateau of substantially constant level as an indicator to command an end of purging. But rather, the Takaku et al. reference relies upon the use of a threshold VS as shown in Figure 7 to end purge control. Assuming even for the sake of argument that the section of the curve in Figure 7 just before VS is reached is being cited as the first plateau, the Takaku et al. reference does not use any portion of the curve beyond the VS threshold level as an indicator to command an end of purging. Thus, if the threshold VS is set at an incorrect level, then purging would not be properly or efficiently performed. The Takaku et al. reference makes no mention of a

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second plateau or increase thereto, or the use thereof as an indicator to command an end of purging.

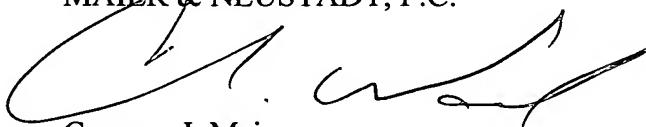
Accordingly, the Takaku et al. reference fails to disclose all of the limitations recited in independent Claims 11 and 24 of the present application. Thus, the Applicants respectfully request the withdrawal of the anticipation rejections of independent Claims 11 and 24 based on the Takaku et al. reference.

The dependent claims are considered allowable for the reasons advanced for the independent claim from which they depend. These claims are further considered allowable as they recite other features of the invention that are neither disclosed nor suggested by the applied references when those features are considered within the context of their respective independent claim.

Consequently, in view of the above discussion, it is respectfully submitted that the present application is in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully Submitted,

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